[10744/7600]

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:	Examiner: Brian J. Broadhead
Peter BAEUERLE	Art Unit 3661
For: METHOD FOR OPERATING A TORQUE-CONVERTER LOCKUP CLUTCH FOR A HYDRODYNAMIC TORQUE CONVERTER AND CONTROL DEVICE FOR IMPLEMENTING THE METHOD	
Filed: October 12, 2001	
Serial No. 09/976,788	

Mail Stop Appeal Brief - Patents
Commissioner for Patents
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Alexandria, Virginia 22313

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APPEAL BRIEF TRANSMITTAL

S I R:

Transmitted herewith for filing in the above-identified patent application, please find an Appeal Brief pursuant to 37 C.F.R. § 41.37, in triplicate.

Please charge the Appeal Brief fee of $500.00, and any other fees that may be required in connection with this communication to the deposit account of **Kenyon & Kenyon**, deposit account number **11-0600.**

Respectfully submitted,

Dated: March 21, 2005

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[10744/7600]

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R.N. 41,154

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APPEAL BRIEF PURSUANT TO 37 C.F.R. § 41.37

S I R:

In the above-identified patent application ("the present application"), Appellant mailed a Notice of Appeal on January 19, 2005 from the Final Office Action issued by the United States Patent and Trademark Office on October 20, 2004. In the Final Office Action, claims 1 to 31 were finally rejected.

This Appeal Brief is submitted in support of the appeal of the final rejection of claims 1 to 31. It is respectfully submitted that the final rejection of claims 1 to 31 should be reversed for the following reasons.

I. Real Party in Interest

The real party in interest in the present appeal is Robert Bosch GmbH of Stuttgart in the Federal Republic of Germany. Robert Bosch GmbH is the assignee of the entire right, title and interest in the present application.

II. Related Appeals and Interferences

There are no other prior or pending appeals, interferences or judicial proceedings known by the undersigned, or believed by the undersigned to be known to Appellant or the assignee, Robert Bosch GmbH, "which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal."

III. Status of Claims

The claims on appeal in the present appeal are claims 1 to 31.

Claims 1 to 31 stand finally rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 5,029,087 ("Cowan et al.").

IV. Status of Amendments

No amendments have been filed subsequent to the final rejection of October 20, 2004.

V. Summary of Claimed Subject Matter

An exemplary embodiment of the method of the present invention relates to a method for operating a torque-converter lockup clutch (20) for a hydrodynamic torque converter (1). (Specification p. 1, lines 1 to 2). In this embodiment, the slip of the torque converter (1) is adjusted using a setpoint value (sw), while the torque-converter lockup clutch (20) is being closed. (Specification p. 1, lines 2 to 5). The setpoint value (sw) is continuously selected inside a closing interval after the initiation of said closing interval as a function of time and taking into account the input torque (E) currently applied to the torque converter (1). (Specification p. 13, lines 7 to 14).

An exemplary embodiment of the device of the present invention relates to a control device (24) for a torque-converter lockup clutch (20) for a hydrodynamic torque converter (1). (Specification p. 1, lines 1 to 2). In this embodiment, a sensor (32) for detecting the input torque (E) applied to the torque converter (1) is connected to a control unit

(26). (Specification p. 10, line 34 to p. 11, line 3). Further, the control unit (26) selects a setpoint value (sw) inside a closing interval after the initiation of said closing interval for the slip of the torque converter as a function of time and takes into consideration the input torque (E) currently being applied to the torque converter (1) inside the closing interval. (Specification p. 13, lines 9 to 14).

An exemplary embodiment of the method of the present invention relates to a method for operating a torque-converter lockup clutch (20) for a hydrodynamic torque converter (1). (Specification p. 1, lines 1 to 2). In this embodiment, the slip of the torque converter is adjusted in accordance with a setpoint value (sw) while closing the torque-converter lockup clutch (20). (Specification p. 1, lines 2 to 5). Further, the setpoint value (sw) is continuously selected inside a closing interval after the initiation of said closing interval as a function of time and takes into account the input torque (E) currently applied to the torque converter (1). (Specification p. 13, lines 9 to 14).

An exemplary embodiment of the device of the present invention the device relates to a control device for a torque-converter lockup clutch (20) for a hydrodynamic torque converter (1). (Specification p. 1, lines 1 to 2). The control device includes a control unit (26) and a sensor (32) connected to the control unit (26). (Specification p. 10, line 34 to p. 11, line 3). The sensor (32) is configured to detect input torque applied to the torque converter (1). (Specification p. 11, lines 3 to 5). Further, the control unit (26) is configured to select a setpoint value (sw) for the slip of the torque converter (1) inside a closing interval after the initiation of said closing interval as a function of time and taking into consideration the input torque currently being applied to the torque converter (1). (Specification p. 13, lines 9 to 14).

An exemplary embodiment of the method of the present invention relates to a method for transitioning a torque-converter lockup clutch (20) from an open state to a closed state. In this embodiment, the clutch slip is adjusted during a closing interval to a setpoint value (sw) according to a desired predetermined setpoint value time characteristic. (Specification p. 1, lines 2 to 5). Further, the predetermined setpoint value time characteristic is continuously adjusted within the closing interval taking into consideration the input torque (E) currently being applied to the torque converter (1). (Specification p. 13, lines 9 to 14).

VI. Ground of Rejection to be Reviewed on Appeal

The ground of rejection for review is whether claims 1 to 31 are patentable over Cowan et al.

VII. Argument

Claims 1 to 31 stand finally rejected under 35 U.S.C. § 102(b) as anticipated by Cowan et al. Appellant respectfully submits that Cowan et al. do not anticipate claims 1 to 31 for the following reasons and respectfully submit that the present rejection, as applied to claims 1 to 31, should be reversed.

Cowan et al. purportedly relate to a control for a hydrokinetic torque converter lockup clutch. Abstract. The system of Cowan et al. makes efforts to assure, via error compensation, that the system is controlled consistent with the chosen setpoint value preselected time characteristic, *i.e.*, the "desired" slip. The duty cycle to the solenoid is tweaked to compensate for the difference between the actual slip and the desired slip. In contrast, the present claims focus on a shift to a completely different preselected time characteristic, *i.e.*, desired slip curve, upon detection of a predetermined level of change in the input torque. See Figure 2 and p. 4, lines 26 to 29.

To control the magnitude of clutch slippage a target slip is stated by Cowan et al. to be set according to variables such as engine and turbine speed. See col. 2, lines 13 to 17 and col. 3, lines 5 to 9. A torque converter lockup control is stated to establish a calculated converter slip range by controlling the duty cycle for a pulse width pressure that actuates the clutch. See col. 2, lines 26 to 29. The duty cycle for the solenoid valve is stated to be adjusted in accordance with the computation of the controller which computes a corrected slip which takes into account a slip error. See col. 2, lines 41 to 46. The slip error is determined to be the difference between a desired slip and the measured slip. See col. 3, lines 30 to 31. A duty cycle is then computed as a result of that computation so that the bypass clutch control valve, which is sensitive to changes in duty cycle, will produce a controlled decay of slip with respect to time. See col. 3, lines 36 to 40. The error is stated to be used to address the duty cycle memory register for the appropriate value which in turn causes an adjustment of the input to the pulse width modulated solenoid. See col. 3, lines 64 to 67.

Appellant respectfully submits that Cowan et al. do not disclose, or even suggest, selecting a setpoint value taking into account the input torque currently applied to the torque converter, as recited in claims 1, 11, 16 and 26, or continuously adjusting the predetermined setpoint value time characteristic within the closing interval taking into consideration the input torque currently being applied to the torque converter, as recited in claim 31.

According to the present claims, a transition from the open state into the closed state of the torque-converter lockup clutch is achieved according to a preselected time characteristic converting the slip present at the beginning of the closing interval as an initial value into a target value, within the closing interval. See p. 4, lines 7 to 13. This preselected time characteristic corresponds generally with the "desired" slip curve shown in Figure 6 of Cowan et al. Cowan et al. recognize, however, that in reality the actual slip as controlled, for example, by a solenoid, is different than the desired slip, and therefore, adjusts the duty cycle of the solenoid so as to compensate for this error. Nowhere, however, do Cowan et al. disclose, or even suggest, that its system takes into account an input torque currently applied to a torque converter in making this error adjustment. Rather, Cowan et al. state that its calculation takes into account the desired slip less a computed actual slip, neither of which take into account the input torque (E) currently applied to the torque converter. See col. 3, lines 12 to 14. The desired slip is stated to depend on information from a throttle position sensor, an engine speed sensor, a gear shift selector sensor, oil temperature sensor and transmission input shaft speed sensor. Further, the actual slip calculation is stated to depend on engine speed and turbine speed. See col. 3, lines 8 to 9. Consistent with the above, Cowan et al. state that rapid torque changes result in "eventual compensation of duty cYcle [sic]," *i.e.,* over successive loops, but that the system "will allow rapid torque changes," *i.e.,* without generating a new setpoint value, "to be absorbed by short periods of increased slip, or decreased slip," *i.e.,* within a given closing interval, "as the case may be, without being felt by the driver." See col. 15, lines 47 to 53. Therefore, Cowan et al. do not disclose all of the features recited in claims 1, 11, 16, 26 and 31.

The Final Office Action refers to Figures 5 and 6, col. 4, lines 30 to 38 and col. 13, lines 11 to 31 and alleges that Cowan et al. disclose taking into account an input torque applied to a torque converter. However, none of the referenced portions even mention an input torque applied to a torque converter. The Final Office Action further alleges that Cowan et al. at col. 5, lines 5 to 11, disclose taking into account an input torque by adjusting a slip to absorb torque changes. Appellant respectfully submits that the Final Office Action mischaracterizes Cowan et al. in this regard.

The Final Office Action asserts that Cowan et al. adjust a slip to absorb torque changes. It is not clear if the Final Office Action is referring to the actual slip or the calculated desired slip. Regardless, Appellant respectfully submits that Cowan et al. do not disclose, or even suggest, adjusting either an actual or desired slip to absorb torque changes. Cowan et al. do not adjust an actual slip to absorb torque changes, rather it is the torque

transients that cause a change in slip. In this regard, Cowan et al. state that torque transients caused by engine operating variables, transmission ratio shifting or throttle movements are then absorbed by momentary periods of increased slip. See col. 4, lines 5 to 8. Nor do Cowan et al. adjust the calculated desired slip to absorb torque changes. As indicated above, the desired slip depends upon information from a throttle position sensor, an engine speed sensor, a gear shift selector sensor, oil temperature sensor and transmission input shaft speed sensor not torque changes. See col. 3, line 67 to col. 4, line 2.

To anticipate a claim, each and every element as set forth in the claim must be found in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of Calif.*, 814 F.2d 628, 631, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987). Furthermore, "[t]he identical invention must be shown in as complete detail as is contained in the . . . claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 U.S.P.Q.2d 1913, 1920 (Fed. Cir. 1989). That is, the prior art must describe the elements arranged as required by the claims. *In re Bond*, 910 F.2d 831, 15 U.S.P.Q.2d 1566 (Fed. Cir. 1990). As more fully set forth above, it is respectfully submitted that nowhere do Cowan et al. disclose, or even suggest, all of the features recited in claims 1, 11, 16, 26 and 31. Therefore, it is respectfully submitted that Cowan et al. do not anticipate claims 1, 11, 16, 26 and 31.

As for claims 2 to 10, which ultimately depend from claim 1 and therefore include all of the limitations of claim 1, Appellant respectfully submits that Cowan et al. do not anticipate these dependent claims for at least the same reasons provided above in support of the patentability of claim 1.

As for claims 12 to 15, which ultimately depend from claim 11 and therefore include all of the limitations of claim 11, Appellant respectfully submits that Cowan et al. do not anticipate these dependent claims for at least the same reasons provided above in support of the patentability of claim 11.

As for claims 17 to 25, which ultimately depend from claim 16 and therefore include all of the limitations of claim 16, Appellant respectfully submits that Cowan et al. do not anticipate these dependent claims for at least the same reasons provided above in support of the patentability of claim 16.

As for claims 27 to 30, which ultimately depend from claim 26 and therefore include all of the limitations of claim 26, Appellant respectfully submits that Cowan et al. do not anticipate these dependent claims for at least the same reasons provided above in support of the patentability of claim 26.

In summary, Appellant respectfully submits that claims 1 to 31 are not anticipated by Cowan et al. Reversal of this rejection is respectfully requested.

VIII. Claims Appendix

An appendix containing a copy of the claims involved in the present appeal is attached hereto.

IX. Conclusion

In view of the above, it is respectfully requested that the rejection of claims 1 to 31 be reversed and that these claims be allowed as presented.

Respectfully submitted,

Dated: March 21, 2005 By: _____

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Claims Appendix

1. A method for operating a torque-converter lockup clutch (20) for a hydrodynamic torque converter (1), where the slip of the torque converter (1) is adjusted using a setpoint value (sw), while the torque-converter lockup clutch (20) is being closed, the setpoint value (sw) being continuously selected inside a closing interval after the initiation of said closing interval, as a function of time, and taking into account the input torque (E) currently applied to the torque converter (1).

2. The method as recited in Claim 1, where, for the time-dependence of the setpoint value (sw), a preselected time characteristic is taken into account, which converts the slip existing at the beginning of the closing interval as an initial value, into a target value, within the closing interval.

3. The method as recited in Claim 2, where a linear transition from the initial value to the target value is provided as a time characteristic inside the closing interval.

4. The method as recited in Claim 2, where the input torque (E) applied to the torque converter (1) is monitored inside the closing interval; in response to the input torque (E) changing by more than a specifiable tolerance deviation, the slip of the torque converter (1) being ascertained and taken as a basis for a new initial value, which would appear at this input torque (E) in the case of a completely opened torque-converter lockup clutch (20).

5. The method as recited in Claim 4, where the value resulting from the preselected time characteristic for the current time inside the closing interval is selected as the setpoint value (sw) for the slip, the time characteristic converting the initial value ascertained using the currently applied input torque (E) into the target value.

6. The method as recited in Claim 4, where the slip to be used as a new initial value, as a basis for the applied input torque (E) is determined using a stored characteristics map.

7. The method as recited in Claim 4, where the slip to be used as a new initial value, as a basis for the applied input torque (E) is calculated from the applied input torque (E), taking a performance figure of the torque converter (1) into consideration.

8. The method as recited in Claim 1, where, in order to adjust the slip, a controlled parameter is provided for setting a clamping pressure for the torque converter.

9. The method as recited in Claim 1, where the time characteristic of the slip is monitored for a decline, in order to detect the start of power transmission in the torque-converter lockup clutch (20).

10. The method as recited in Claim 9, where, after a decrease in the slip is detected, a clamping pressure for the torque converter (1) is set as a function of a coupling torque to be transmitted, and as a function of the setpoint value (sw) for the slip of the torque-converter lockup clutch (20).

11. A control device (24) for a torque-converter lockup clutch (20) for a hydrodynamic torque converter (1), where a sensor (32) for detecting the input torque (E) applied to the torque converter (1) is connected to a control unit (26), which selects a setpoint value (sw) for the slip of the torque converter (1) inside a closing interval after the initiation of said closing interval as a function of time, and taking into consideration the input torque (E) currently being applied to the torque converter (1) inside the closing interval.

12. The control device (24) as recited in Claim 11, whose control unit (26) is connected on the output side to means for setting a clamping pressure for the torque converter (1).

13. The control device (24) as recited in Claim 11, whose control unit (26) is connected to date storage unit (36), in which a time characteristic for the setpoint value (sw) of the slip is stored, a slip existing at the beginning of a closing interval as an initial value being converted into a target value within the closing interval, in accordance with the time characteristic for the setpoint value of the slip.

14. The control device (24) as recited in Claim 13, in whose data storage unit (36) a data record is stored, from which a slip value can be derived for each input torque (E), the slip value being intended to be used as an initial value, as a basis for determining the setpoint value (sw) for the slip as a function of time.

15. The control device (24) as recited in Claim 13, in whose data storage unit (36) a characteristics map is stored, which, inside specifiable interval boundaries, assigns each performance figure of the torque converter (1) a corresponding slip value.

16. A method for operating a torque-converter lockup clutch for a hydrodynamic torque converter, comprising:

adjusting the slip of the torque converter in accordance with a setpoint value while closing the torque-converter lockup clutch, the setpoint value continuously selected inside a closing interval after the initiation of said closing interval as a function of time and taking into account the input torque currently applied to the torque converter.

17. The method as recited in Claim 16,

wherein a preselected time characteristic is taken into account for the time-dependence of the setpoint value, said time characteristic converting the slip existing at the beginning of the closing interval as an initial value into a target value within the closing interval.

18. The method as recited in Claim 17,

wherein the time characteristic includes a linear transition from the initial value to the target value inside the closing interval.

19. The method as recited in Claim 17, further comprising monitoring the input torque applied to the torque converter inside the closing interval, said monitoring including ascertaining the slip of the torque converter and taking said slip of the torque converter as a new value when the input torque changes by more than a specifiable tolerance deviation, said new value appearing at this input torque in the case of a completely opened torque-converter lockup clutch.

20. The method as recited in Claim 19,

further comprising selecting the value resulting from the preselected time characteristic for the current time inside the closing interval as the setpoint value for the slip, the time characteristic converting the initial value ascertained using the currently applied input torque into the target value.

21. The method as recited in Claim 19,

wherein the slip to be used as a new initial value and as a basis for the applied input torque is determined using a stored characteristics map.

22. The method as recited in Claim 19,

wherein the slip to be used as a new initial value and as a basis for the applied input torque is calculated from the applied input torque taking into account the performance figure of the torque converter.

23. The method as recited in claim 17,

further comprising providing a controlled parameter for setting a clamping pressure for the torque converter for adjusting the slip.

24. The method as recited in Claim 17,

further comprising detecting the start of power transmission in the torque-converter lockup clutch by monitoring the time characteristic of the slip for a decline.

25. The method as recited in Claim 24,

further comprising setting a clamping pressure for the torque converter as a function of a coupling torque to be transmitted after a decrease in the slip is detected and as a function of the setpoint value for the slip of the torque-converter lockup clutch.

26. A control device for a torque-converter lockup clutch for a hydrodynamic torque converter, comprising:

a control unit; and

a sensor connected to the control unit, said sensor configured to detect input torque applied to the torque converter, said control unit configured to select a setpoint value for the slip of the torque converter inside a closing interval after the initiation of said closing interval as a function of time and taking into consideration the input torque currently being applied to the torque converter.

27. The control device as recited in Claim 26,

wherein the control unit is connected on an output side to an arrangement configured to set a clamping pressure for the torque converter.

28. The control device as recited in Claim 26,

wherein the control unit is connected to a data storage unit configured to store a time characteristic for the setpoint value, said control unit configured to convert a slip existing at the beginning of a closing interval as an initial value into a target value within the closing interval in accordance with the time characteristic for the setpoint value of the slip.

29. The control device as recited in Claim 28,

wherein a data record is stored in the data storage unit, said control unit configured to derive from the data record a slip value for each input torque and in accordance with said slip value as an initial value and as a basis to determine the setpoint value for the slip as a function of time.

30. The control device as recited in Claim 28,

wherein the data storage unit includes a characteristics map, which, inside specifiable interval boundaries, includes a slip value for each corresponding performance figure of the torque converter.

31. A method for transitioning a torque-converter lockup clutch from an open state to a closed state, comprising the steps of:

adjusting the clutch slip during a closing interval to a setpoint value according to a desired predetermined setpoint value time characteristic; and

continuously adjusting the predetermined setpoint value time characteristic within the closing interval taking into consideration the input torque currently being applied to the torque converter element.